harman/kardon

ULTRAWIDEBAND
LINEAR PHASE CASSETTE DECK

CD 401

owner's manual

Thanks and congraturation on
your choice of the Harman/Kardon
CD401 Ultrawideband Linear Phase Cassette Deck.
In order to achieve the best performance of which this high
precision unit is capable, please be sure to read this owner's manual and use your
cassette deck only in accordance with its instructions.
Keep it in safe place for reference in case you
suspect your unit of malfunctioning.

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WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Features

- *Dolby C-Type Noise Reduction System

  In addition to the standard Dolby B-type NR system, your deck provides the ultimate in noise reduction systems, Dolby C. Even with normal cassette tapes, the trailing off of the high frequency responce is dramatically improved, and with metal tapes recorded at the full 0 dB level, the frequency is flat up to 15 ~ 20 kHz.

- HX-PRO System

  Since HX-Professional system keeps Active Bias constant, it allows natural-sounding recordings of the low frequency range. When you record high level, high frequency sound in a conventional way, frequency characteristic will be reduced due to self-demagnetization. HX-PRO works so as to reduce this self-demagnetization far better, so that higher level recording may be capable. Therefore, HX-PRO gives normal tape almost equal performance of metal tape.

- Electric Auto-Search Function

  This makes it easy to find the head portion of each item in the music tape.

- Metal-Tape Compatible

  Tape selector switch for METAL position is added to assure the best performance of metal tape. Since the tape selector switches are provided for BIAS and EQUALIZATION independently; METAL, CrO_2, FeCr, LN, the best performances of each tape can be assured.

- 3-Head, 2-Motor Mechanism

  A 3-head configuration is used to allow monitoring of the recording while it is in progress. Two seperate motors are used — one for the capstan and one for the two reel drives — in a mechanism that boasts extremely high precision and highly reliable tape transport for low wow and flutter.

- Feather-Touch Operational Controls

  Semiconductor logic control gives pleasant, feather-touch control of the mechanism. Direct changes are possible between, for instance, play back and fast forward or rewind. Again, a remote control can be available.

- Memory Auto-Repeat Function

  When playing back the same item repeatedly, or the item just recorded from its beginning, the tape can be rewound to the desired position readily.

- Electrical Tape Counter

  An electrical digital display is used for the tape counter. It is both easier to see and more accurate counter of start and stop position because of its faithful to tape progress, compared with analog type.

*Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbols are trademarks of Dolby Laboratories Licensing Corporation.

General Instructions

Always use at 120V AC

This unit is designed for use at 120V AC. Do not connect the unit to an outlet supplying a higher voltage to prevent fire.

Handle the AC cord carefully

- Always hold the plug when disconnecting the AC cord from the outlet. Pulling at the cord may cause discontinuity.
- If the unit is not used for a prolonged period, disconnect the plug from the outlet.
- Do not place or drop a heavy material such as furniture on the cord. Otherwise, the cord may be damaged to cause fire or shock hazard.

Do not open the cabinet

To prevent shock hazard or unexpected trouble, do not tamper with internal components for inspection or maintenance. Harman Kardon does not guarantee performance degradation resulting from any modification.

When water or a metal piece enters the unit

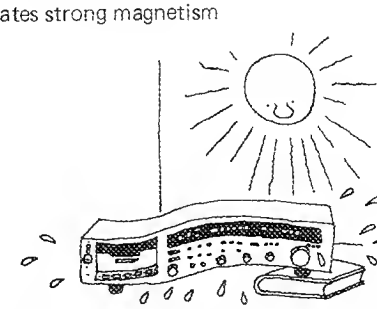
When water, a hairpin or wire accidentally enters the unit, immediately extract the AC plug from the outlet to prevent shock or trouble.

Locations for Installation

Place this unit on a firm flat base.

Avoid the following locations:

- Place exposed to direct sunlight or near a heat source
- Place exposed to excessive moisture
- Cold place such as near a cooling air outlet
- Dusty place
- Place exposed to excessive vibration
- Poorly ventilated place
- Place near a TV receiver, speaker or other object that generates strong magnetism

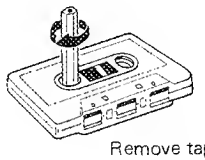


When piling with other components, carefully plan so as not to obstruct heat radiation from a pre-mainamplifier or mainamplifier. Use of a Harman Kardon audio rack is recommended.

*Always disconnect the plug from the outlet before making connections with other components.

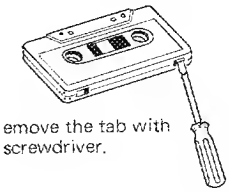
Cassette Tape Handling

- Be sure to remove the cassette tape from the cassette compartment after the end of operation to keep the tape quality and maintain the deck performance for a long time.
- Store cassette tapes off from a strong magnetic field such as near a TV set, amplifier and speakers to prevent adverse effect on the recorded sound.
- Before a cassette tape is played back or recorded, be sure to eliminate tape slackness. A slackened tape, if used, may cause jamming in the tape running mechanism.



Remove tape slackness by winding with a pencil.

- If the sound recorded on the tape is desired to be protected from accidental erasure, remove the erase-prevention tabs. With these tabs broken out, accidental erasure can be prevented even if the RECORD button is inadvertently pressed.



Remove the tab with a screwdriver.

- If it is later desired to record on a cassette tape protected in this way, cover the holes with adhesive tape.

Dolby C-Type NR System

Your deck provides the Dolby C-Type Noise Reduction system, which is said to be the ultimate in noise reduction system. Also, you can work the standard Dolby B-Type Noise Reduction System by changing the B-C select switch.

The Dolby NR System is one of the methods for reducing the noise that is created during the play back of a tape, and is now widely and internationally used. The noise which this system reduces largely emits from the tape itself and this system cannot reduce the noise which comes from the program which is being recorded. Therefore, in order for the Dolby NR System to function more effectively, it is important to avoid recording from signals either from records or FM radio that contain a lot of noise, i.e., it is important to choose signals with as little noise as possible.

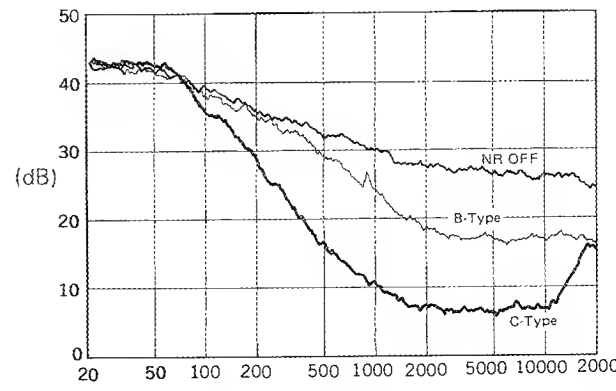
Principle

Any magnetic tape used on a tape recorder contains native noise. In particular, among these noises, the middle and high frequency noises, which we can easily pick up by hearing, are called "hiss noises", and they are said to be caused by the size of magnetic particles on the tape. Hiss noises decrease if the magnetic particles are small, and also decreases if the tape is played at a higher speed. In other words, the high speed of the tape playing, and the small size of the magnetic particles produce the same effect as regards the hiss noise. In this respect a cassette tape played at a low speed, will produce more hiss noise.

Function of the Dolby Noise Reduction

When the recording input signals are lower than the standard level, those middle and high frequency sounds among those signals are gradually strengthened and recorded. The signals will return to the original state if a tape is played back opposite to the way it was recorded, i.e., if it is played back with middle and high frequency sounds above the standard level being gradually weakened. At the same time tape hiss sounds, which are middle and high frequency noises, created during the play back are reduced accordingly, as the signals become smaller. Noise reduction is achieved in this way.

While the Dolby B-Type NR System has only the noise reduction capacity of the noise level of 10 dB, the Dolby C-Type NR System has a capacity of 20 dB. This C-Type NR System, in comparison, has an improvement in its function in the high frequency range so that it can be used for 0 dB recording. The Dolby C-Type NR System assures enough dynamic range and SN ratio to record a HI-FI program source.



NOISE SPECTRA

Components and Their Functions

❶ CASSETT COMPARTMENT

❷ POWER INDICATOR
For indication of power supply to this unit.

❸ POWER SWITCH (POWER)
For power turning on and off.
When this switch is pressed with the AC cord plugged to an AC outlet, the POWER INDICATOR illuminates.

❹ ELECTRONIC AUTO SEARCH INDICATOR
For indication of functioning of the electronic auto search system.

❺ ELECTRONIC AUTO SEARCH SWITCH (ELECTRONIC AUTO SEARCH)
For quick cueing of the start of a music.
When this switch is depressed, the ELECTRONIC AUTO SEARCH INDICATOR illuminates and a start of each music is automatically searched so as to enable sequential playback of the musics recorded in a tape.
See Electronic Auto Search System for details.

❻ EJECT BUTTON (EJECT)
For opening the CASSETTE COMPARTMENT door.
The soft eject mechanism opens the door slowly when this button is pressed.
Caution: Never press this button while tape running. Be sure to press the STOP button before pressing the EJECT button.

❼ RECORD MUTE BUTTON (REC MUTE)
For providing a soundless interval during recording.
To cut off undesirable sound between melodies, keep this button pressed until the next melody starts. No sound is recorded as long as this button is kept pressed.

❽ RECORD INDICATOR
For indication of recording state.

❾ RECORD BUTTON (● RECORD)
For recording on a tape.
Press this button after pressing the PAUSE button to provide standby state for recording. The RECORD INDICATOR blinks and the PAUSE and PLAY INDICATORS illuminate. Recording starts when the PAUSE button is pressed again. The RECORD INDICATOR goes to continuous illumination and the PAUSE INDICATOR extinguishes.

❿ REWIND INDICATOR
For indication of tape rewinding.

⓫ REWIND BUTTON (◀◀ REW)
For rewinding of a tape at a high speed.

⓬ PLAY INDICATOR
For indication of tape playback.

⓭ PLAY BUTTON (PLAY ▶)
For playback of a tape.
Press this button to start playback.

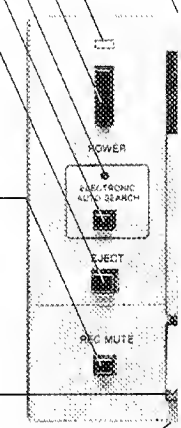
⓮ FAST FORWARD INDICATOR
For indication of fast forwarding of a tape.

⓯ FAST FORWARD BUTTON (F. FWD ▶▶)
For fast forwarding of a tape.

⓰ STOP BUTTON (STOP ■)
For stopping each operation.
Pressing this button stops playback, recording, fast forwarding or rewinding of a tape. It also cancels standby state by PAUSE button operation.

⓱ PAUSE INDICATOR
For indication of pause state.

⓲ PAUSE BUTTON (PAUSE ▮▮)
For temporary stopping of playback or recording.
Also press this button to provide standby state for playback or recording. With this button pressed, both the PAUSE and the PLAY INDICATORS turn on at the same time. Then to start playback, press the PAUSE button again or to start recording, press the RECORD button first and the PAUSE button.

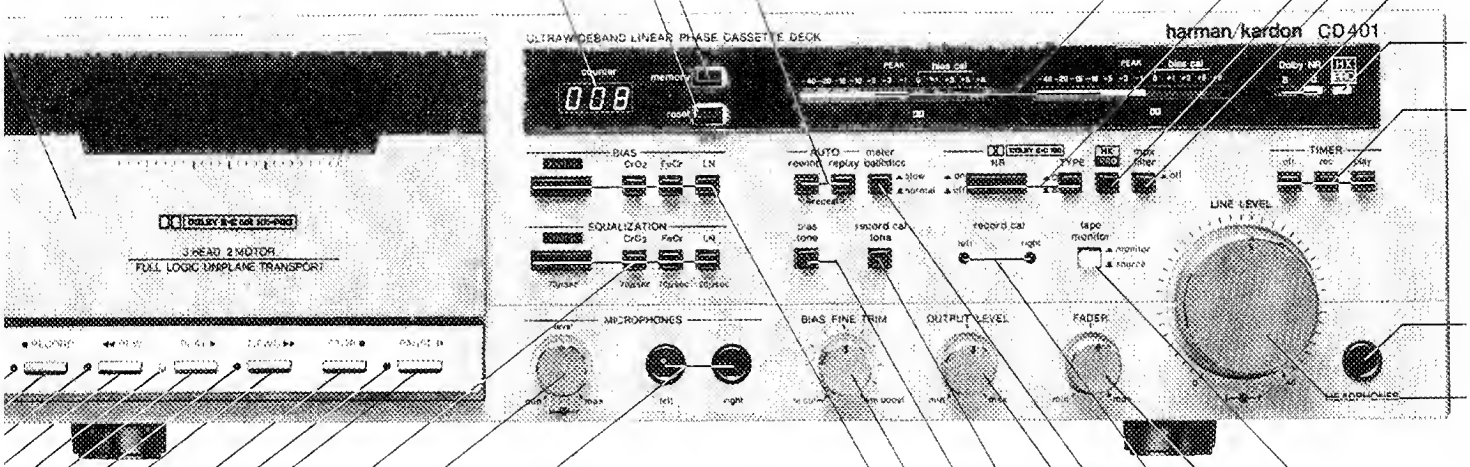


:MORY BUTTON (memory)
r automatic stopping of tape rewinding at a sired position in combination with the RE-T button.
press this button and push the RESET but-n during playback or recording to reset the PE COUNTER to "000".
ien the tape is rewound in this state, tape ining automatically stops at the position iere the TAPE COUNTER indicates "000".

⑲ RESET BUTTON (reset)
For resetting the TAPE COUNTER to "000". Press this button to reset the counter to "000" when starting recording. This button is also used with the MEMORY button to stop tape rewinding automatically at the desired position.

⑱ TAPE COUNTER (counter)
For digital display of the position in a cassette tape.
The figure changes as the tape runs. Cueing for the start of a melody is facilitated by making a note of the counter reading.

㉙ AUTOMATIC REPEAT BUTTONS (AUTO)
• AUTO REWIND BUTTON (rewind)
When this button is set in ON position (pressed), the tape is automatically rewound , after playback or recording to the tape end, either to the beginning of the tape or to "000" of the TAPE COUNTER indication when the MEMORY button is pressed on.
• AUTO REPLAY BUTTON (replay)
When this button is set in ON position (pressed), the tape playback automatically starts after rewound either from "000" position of the TAPE COUNTER indication when the MEMORY button is pressed on or from the beginning of the tape.
When these two buttons are set in ON position (pressed), the tape is automatically rewound from the tape end to the beginning of the tape or to "000" of the TAPE COUNTER indication when the MEMORY button is pressed ON and then playback starts automatically. Automatic rewind and playback are accomplished repeatedly. See Automatic Repeat System for details.



㉒ MICROPHONE JACKS (MICROPHONES)
For connection of recording microphones. Use low-impedance microphones.

㉑ BIAS SELECTORS (BIAS)
Press the button meeting the type of the tape for recording. If no button is pressed, the RECORD INDICATOR does not turn on and recording cannot be accomplished. These buttons are not effective in tape playback.

⑳ MICROPHONE INPUT LEVEL CONTROLS (MICROPHONES-level)
For input level control during recording through microphones.
The front side knob is for the left channel and the rear one is for the right channel.
The knobs turn simultaneously when turned normally.

UALIZATION SELECTORS
UALIZATION)
s the button meeting the type of the tape playback. These buttons are not effective ecording.

㉓ BIAS FINE TRIM KNOB (BIAS FINE TRIM)
For setting of the optimal bias for the tape to be used. See Bias Fine Trim Feature for details.

㉔ BIAS TONE BUTTON (bias tone)
For setting of optimal bias for each tape.
While this switch is kept pressed, 400 Hz signal is recorded in the left channel, and 12.5 kHz in the right channel. See Bias Fine Frim Feature for details.

㉕ RECORD CALIBRATION TONE BUTTON (record cal tone)
For recording level calibration according to the type of the tape to be used.
When this switch is kept pressed, 400 Hz signal is recorded on the tape. Make adjustment by operating the RECORD CALIBRATION controls during reproduction of this signal recorded on the tape so that the LED LEVEL DISPLAY may indicate 0 dB. See Record Calibration Feature for details.

㉑ LED LEVEL DISPLAY (PEAK)
For clear indication of the recording or playback level.

㉒ HX-PRO SWITCH (HX-PRO)
Press the switch when recording in HX-PRO system.
See HX-PRO System for details.

㉓ MPX FILTER SWITCH (mpx filter)
For cutting the multiplex noise during recording of an FM stereo broadcasting program by using the Dolby NR system. Depress this switch to invalidate the MPX filter function.

㉔ DOLBY NR INDICATORS (Dolby NR B, C)
For indication of the validated Dolby NR system type.

㉕ TIMER SWITCHES (TIMER)
These switches are used to automatically start recording or playback in combination with an audio timer.
REC Switch : For automatic recording.
PLAY Switch : For automatic tape playback.
OFF Switch : When audio timer is not used.
See Timer Function for details.

㉖ LINE INPUT LEVEL CONTROL (LINE LEVEL)
For input level control during recording from an external component.
The front side knob is for the left channel and the rear one is for the right channel. The knobs turn simultaneously when turned normally.

㉗ FADER KNOB (FADER)
For fade-in and fade-out function to satisfy more variety in recording.
This makes it easy for you to start and/or end an item in recording, and to make the silent pauses.

㉘ RECORD CALIBRATION CONTROLS (record cal)
Variable resistors to calibrate the recording level to 0 dB according to the type of the tape to be used. Make adjustment with a thin screwdriver through the hole. See Record Calibration Feature for details.

㉙ OUTPUT LEVEL CONTROL (OUTPUT LEVEL)
For control of the output level during playback or monitoring of the recording sound.
It also control the volume of the sound monitored through headphones.

㉚ DOLBY NR SYSTEM SELECTOR (DOLBY B·C NR)
* NR ON/OFF SELECTER (NR)
For recording or playback using the Dolby NR system.
Press this selector to use the Dolby NR system. The green DOLBY NR INDICATOR (for B-type) or the yellow one (for C-type) illuminates according to the NR TYPE selector position. Press this selector again to invalidate the Dolby NR system.
* NR TYPE SELECTER (TYPE)
For selection of Dolby B- or C-type NR system.
Depress this selector to select the Dolby C-type NR system. Press it again and the B-type is selected.

㉛ HX-PRO INDICATOR (HX-PRO)
For indication that recording is in progress using HX-PRO system.

㉜ HEADPHONES JACK (HEADPHONES)
For connection of stereo headphones.
The sound volume can be adjusted by the OUTPUT LEVEL control.
For tape playback, be sure to set the TAPE MONITOR swtich in the MONITOR position without fail.

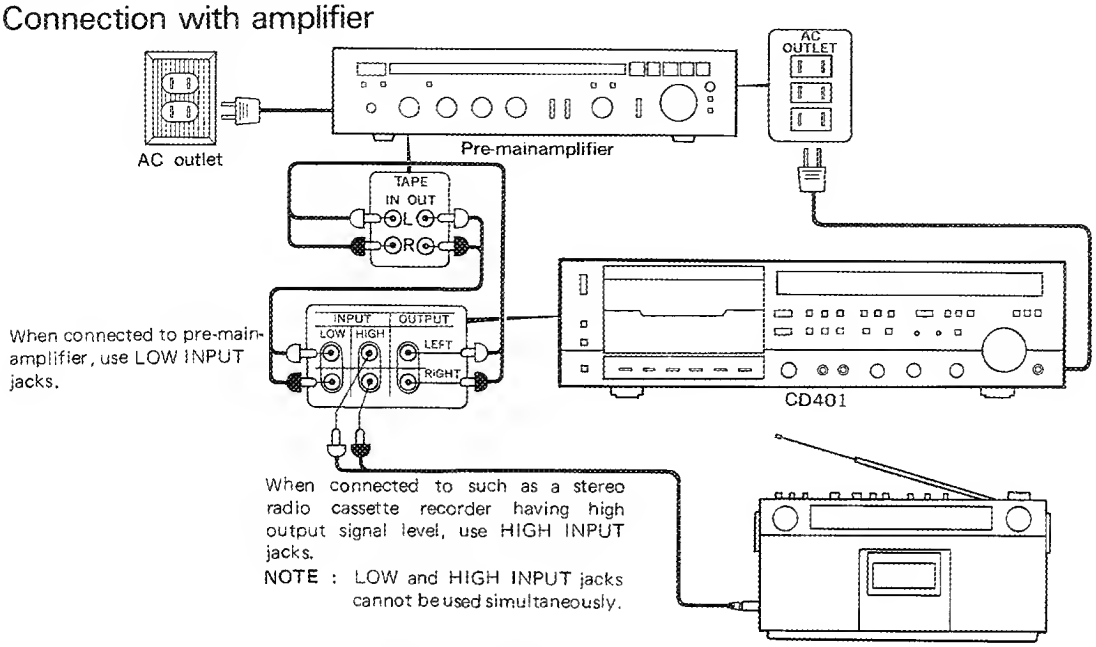
㉝ TAPE MONITOR SWITCH (tape monitor)
When the MONITOR position is selected, signal being recorded (playback signal)can be heard. The button goes on indicating that the MONITOR position is selected.
When the SOURCE position is selected, signal before recording (recording input) can be heard.
Check the source sound and playback sound by pressing the switch while recording to check to be sure that source sound is correctly recorded. Be sure to place the switch in the MONITOR position while tape playback.

㉞ METER BALLISTICS SELECTOR (meter ballistics)
For selection between normal and slow LED LEVEL DISPLAY recovery time.

Connections

- Always disconnect the AC cords connected to mains outlets before making connections between components.
- Use the attached connection cords. Connect the plugs correctly to left and right channel jacks.
- Insert plugs fully. Imperfect insertion may cause noise or sound reproduction failure.

Connection with amplifier

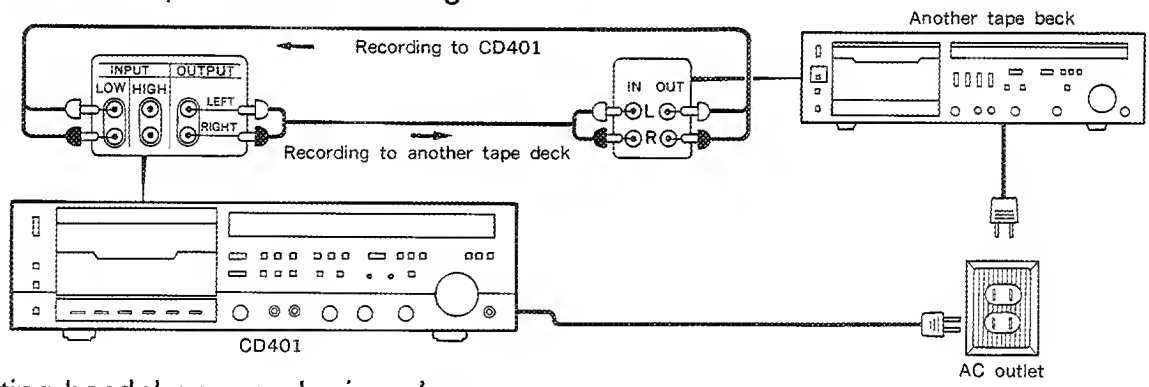


When connected to pre-main-amplifier, use LOW INPUT jacks.

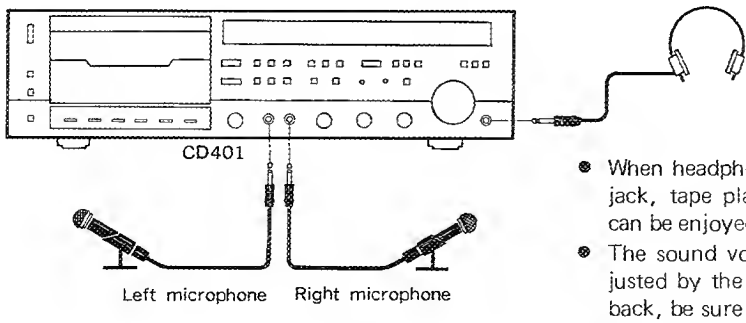
When connected to such as a stereo radio cassette recorder having high output signal level, use HIGH INPUT jacks.

NOTE : LOW and HIGH INPUT jacks cannot be used simultaneously.

Connection with tape deck for dubbing



Connecting headphones and microphones



- Use low-impedance microphones. (600Ω in the standard.)
- The recording level can be adjusted by the MICROPHONE INPUT LEVEL controls.
- Turn the LINE INPUT LEVEL controls to the "0" position when only microphones are used. For mixing, adjust their positions as desired.
- Use microphones with standard plugs.
- When recording with one microphone, connect it to the left or right MICROPHONE jack whichever you like. In either case, monaural recording on both channels occurs.

- When headphones are connected to the HEADPHONES jack, tape playback sound or recorded monitor sound can be enjoyed without connecting an amplifier.
- The sound volume through the headphones can be adjusted by the OUTPUT LEVEL control. For tape playback, be sure to set the TAPE MONITOR switch in the MONITOR position without fail.
- Use headphones with the standard connecting plug.

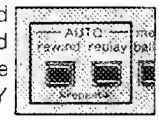
Operation Procedures

Tape Playback

1. Turn on your amplifier, turn the volume control to the minimum level and select the tape monitor function on the amplifier according to its owner's manual.
2. Press the POWER switch, and the POWER INDICATOR illuminates.
3. Press the EJECT button to open the CASSETTE COMPARTMENT door, and insert the recorded cassette tape correctly in the compartment. Incorrect insertion may cause failure in door closing or playback.
4. Press the EQUALIZATION selector according to the type of the using tape.
5. Press the DOLBY NR ON/OFF selector for a tape recorded by using the Dolby NR system. Select the B or C NR type by the NR TYPE selector.
6. Press the TAPE MONITOR switch in the MONITOR position.
7. Press the PLAY button. The PLAY INDICATOR illuminates and the tape starts to be played back.
8. Gradually turn the OUTPUT LEVEL control and the volume control of your amplifier until the playback sound is heard.
9. Press the PAUSE button for temporary stopping of the tape. Press it again to restart tape playback.
10. Press the STOP button to stop tape playback halfway.
11. Tape running automatically stops when the tape end is reached.

Automatic Repeat System

CD401 is equipped with convenient AUTOMATIC REPEAT function which automatically rewinds the tape after recording or playback to a desired point, AUTOMATIC REWIND function, and automatically starts tape playback from the rewound point, AUTOMATIC REPLAY function.



Automatic rewind

1. After inserting a cassette tape in the CASSETTE COMPARTMENT, press the AUTO REWIND button in the ON position.
2. Start tape playback or recording.
3. To rewind the tape to a desired point, press the RESET button at such point to reset the TAPE COUNTER indication to "000" and then press the MEMORY button. When rewinding the tape to the beginning of the tape, press the MEMORY button again to release it.
4. At the tape end, the tape is rewound to "000" position or to the beginning of the tape according to the MEMORY button setting and then stops.

Automatic replay

1. After inserting a cassette tape in the CASSETTE COMPARTMENT, press the AUTO REPLAY button in the ON position.
2. Start tape playback or recording.
3. To start tape playback from a desired point, press the RESET button at such point to reset the TAPE COUNTER indication to "000" and then press the MEMORY button. When replaying the tape from the beginning, press the MEMORY button again to release it.
4. When the REWIND button is pressed while tape playback or recording or at the end of the tape, tape rewinding starts.
5. At the TAPE COUNTER indication "000" or at the beginning of the tape, tape rewinding stops and tape playback automatically starts again.

Automatic repeat

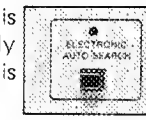
1. After inserting a cassette tape in the CASSETTE COMPARTMENT, press both the AUTO REWIND and the AUTO REPLAY buttons in the ON position.
2. Start tape playback or recording.
3. To repeat tape playback from a desired point, press the RESET button at such point to reset the TAPE COUNTER indication to "000" and then press the MEMORY button. When repeating from the beginning of the tape, release the MEMORY button by pressing it again.
4. At the end of the tape while tape playback or recording, the tape is automatically rewound the beginning of the tape or to "000" position of the TAPE COUNTER indication according to the MEMORY button setting and then tape playback starts automatically. This cycle is repeated until such setting is released.

Electronic Auto Search System (EASS)

The EASS detects the non-recorded portion between musics and automatically repeats cueing.

Operate as follows:

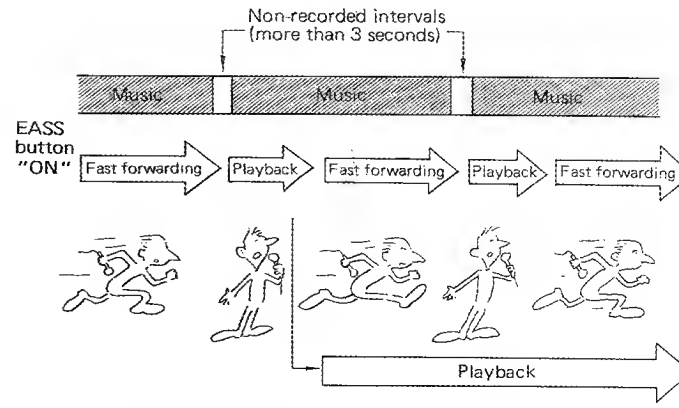
1 Press the ELECTRONIC AUTO SEARCH switch. The mode is automatically switched to fast forwarding. When the start of the next music is sensed, the mode is automatically switched to playback and the music is played for about 10 seconds.



2. If the music is the desired one, press the PLAY button, and the EASS is cancelled and tape playback starts. If the PLAY button is not pressed, the mode again returns to fast forwarding and cueing is repeated.
3. The EASS is automatically cancelled when the tape end is reached.

Notes:

- The EASS is set by pressing the ELECTRONIC AUTO SEARCH switch when the tape is played back or stopped.
- The EASS mode is cancelled when any button (RECORD, REWIND, PLAY, FAST FORWARD, STOP, or PAUSE) is pressed.
- If the non-recorded interval between musics is less than about 3 seconds, cueing may be failed. When very low level signal such as pianissimo continues, stopping at the start of the succeeding high level signal may occur.



Press the PLAY button within this period to cause continuous playback.

Operation Procedures

Tape Recording

1. Turn on the POWER switch. The POWER INDICATOR illuminates.
2. Press the EJECT button to open the CASSETTE COMPARTMENT door and insert a cassette tape correctly. Incorrect insertion may cause failure in door closing or recording.
3. Press one of the BIAS selector buttons according to the type of the using tape. If no button is pressed, recording is impossible and the RECORD INDICATOR does not illuminate.
4. Set the TAPE MONITOR switch in the SOURCE position.
5. Adjust the recording level following the instructions provided in Recording Level Adjustment by turning the LINE INPUT LEVEL controls. Turn the MICROPHONE INPUT LEVEL controls to MIN position.
6. To record through the Dolby NR system, depress the NR ON/OFF selector and select the B or C type by operating the NR TYPE selector. Check the selected type by illumination of the TYPE INDICATOR. The "B" TYPE INDICATOR illuminates in green color, and the "C" TYPE INDICATOR in yellow.
7. When recording sounds using HX-PRO system, press the HX-PRO switch. When it is pressed in the ON position, the red HX-PRO INDICATOR turns on.
8. To record an FM stereo broadcasting program with the Dolby NR system, be sure that the MPX FILTER switch is on. This switch is off when depressed.
9. Press the RESET button to reset the TAPE COUNTER indication to "000".
10. Press the PAUSE button. The PLAY and PAUSE INDICATORS illuminate. Then, press the RECORD button. The RECORD INDICATOR starts blinking in red color to show standby state for recording. The tape does not run in this state.
11. Press the PAUSE button again to start recording. The PAUSE INDICATOR extinguishes and the RECORD INDICATOR goes to continuous illumination.
12. To monitor the recording, press the TAPE MONITOR switch to MONITOR position. The TAPE MONITOR switch button illuminates in green. This allows to monitor the recording while it is in progress.
13. Press the PAUSE button for temporary stopping of the tape. Press it again to restart recording.
14. Press the STOP button to stop recording halfway.
15. Tape running stops automatically when the tape end is reached, and the recording mode is cancelled.

Recording through microphones

Connect the left and right microphone cords correctly to MICROPHONE jacks. Turn the MICROPHONE INPUT LEVEL controls to set the proper input level.When recording only through microphones, place the LINE INPUT LEVEL control at its "0" position.
For mixing recording, place the LINE INPUT LEVEL control at the desired level position.

Recording from a turntable

Press the subsonic filter on your amplifier as required.

Dubbing without using an amplifier

Connect this unit as shown in "Connection with tape deck for dubbing", and carry out dubbing operation.

Recording Level Adjustment

Adjust the recording level by turning the LINE INPUT LEVEL or MICROPHONE INPUT LEVEL controls meeting the source of tape recording with observing indication of the LED LEVEL DISPLAY.
Make adjustment as described below when the sound level is relatively high.

When using a metal tape

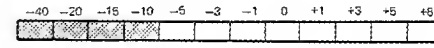
Momentary illumination up to +3 dB is allowable.

When using a chrome tape

When using a ferrichrome or normal tape

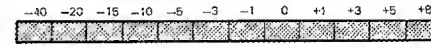
The following adjustments will cause excessive sound distortion or tape noise.

Too low level setting (illumination up to about – 10 dB)



Recording with excessive tape noise will result.

Too high level setting (illumination up to +3 dB to +8 dB)



Recording with excessive distortion will result.

Record Mute Button

If the sound (such as CM or narration) between programs is desired to be cut off during recording, recording function can be invalidated by pressing the RECORD MUTE button. At least 3-second silent pause between programs is indispensable for using the EASS.

1. Press the RECORD MUTE button continuously after a program ends. No sound is recorded on the tape as long as this button is kept pressed.
2. After a few seconds, press the PAUSE button and wait for the next program.

Operation Procedures

Bias Fine Trim Feature

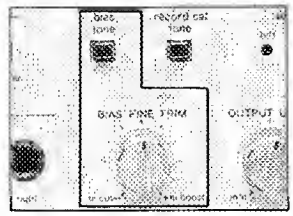
The optimal recording bias rating of the tape of each brand is somewhat different from that of other brands. The bias fine trim feature is provided to enable fine adjustment for such difference.

The high frequency range tends to be attenuated if the bias current is higher than the rated value for a tape while it tends to be boosted if the bias current is less than the rated value.

This unit aims to obtain a flat frequency characteristic by recording 400 Hz standard signal in the left channel and 12.5 kHz standard signal in the right channel, and by adjusting the BIAS FINE TRIM knob so that both channels show the same playback level.

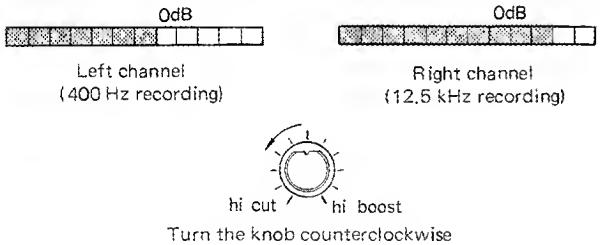
Operate as follows:

1. Insert a cassette tape in the CASSETTE COMPARTMENT and place the BIAS and EQUALIZATION selectors at the position corresponding to the using tape type.
2. Press the TAPE MONITOR switch in the MONITOR position.
3. Press the RECORD and PLAY buttons together to start the tape. With these two buttons pressed, tape recording starts.



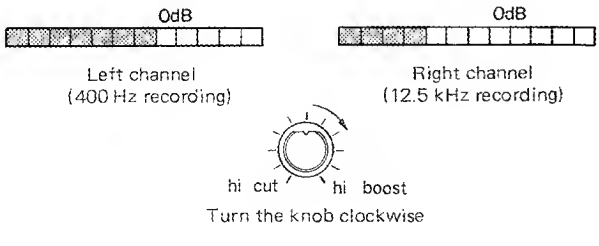
4. Keep the BIAS TONE button pressed. 400 Hz signal and 12.5 kHz signal are recorded in the left and right channels, respectively.
5. Compare LED LEVEL DISPLAY left and right channel readings. Turn the BIAS FINE TRIM knob if right channel reading differs from left channel reading so that right channel reading equals to left channel reading.

When the right channel level is higher



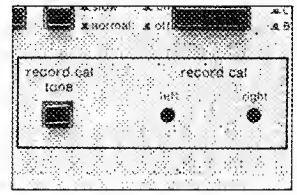
Turn the knob counterclockwise

When the right channel level is lower



Turn the knob clockwise

Record Calibration Feature

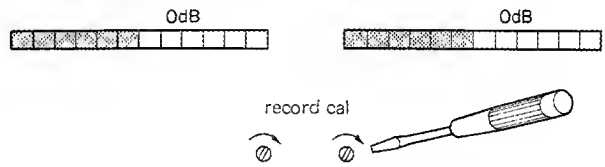


Each tape has different sensitivity. As a result, the playback level may be deviated from the LED LEVEL DISPLAY reading. The record calibration feature adjusts the LED LEVEL DISPLAY reading to the specified value for each tape so as to enable proper recording and playback level setting. This is especially important for recording with the Dolby NR system.

Operate as follows:

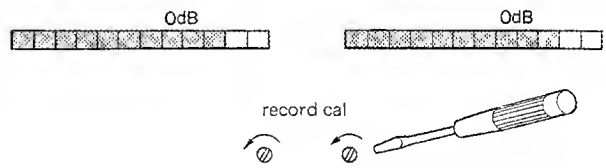
1. Insert a cassette tape of the type which is most frequently used into the CASSETTE COMPARTMENT.
2. Press the BIAS and EQUALIZATION selectors according to the tape type.
3. Press the TAPE MONITOR switch in the MONITOR position.
4. Press the RECORD and PLAY button together to start the tape, and keep pressing the RECORD CALBRATION TONE button.
5. If the LED LEVEL DISPLAY shows 0 dB, no adjustment is required.
6. If the indicated level is above or below 0 dB, adjust the RECORD CALIBRATION controls.

If the level indication is lower than 0 dB



Turn the controls clockwise with a thin screwdriver.

If the level indication is higher than 0 dB



Turn the controls counterclockwise with a thin screwdriver.

Note: Adjustment to 0 dB may be failed if the used tape is old or a poor in quality.

Operation Procedures

HX-PRO System

By varying the bias level to compensate for the different characteristics of the input signal, Active Bias is kept constant, so that this allows natural-sounding recordings of the low frequency region. Also, much higher levels of high frequencies can be recorded.
If we consider specific sectors of the frequency range, then, if a signal source only contains high frequency components, the HX-PRO will detect this and reduce the bias from the oscillator to the optimum bias for the signal. On the other hand, no changes in bias level will be made for signal sources that contains only low frequency sounds. However, when low frequency signals contain occasional admixtures of high frequency signals, the HX-PRO will reduce the bias, changing only high frequency bias levels while keeping lower frequency bias level constant. The new system, therefore, not only offers an improvement at high frequencies, but also ensures the optimum bias at low frequencies, too.

Advantages of the HX-PRO

1. Gives performance almost equal to metal tape for normal tape.
2. Outstanding treble dynamic range.
3. Adjustment to left and right channels can be made independently.
4. All kinds of tape from normal through metal are suitable.

Erasing the Recorded Signals

When a new recording is made on a recorded tape, the recorded sound on that part of the tape is automatically erased. To erase the recorded sound on the tape without recording, operate as follows:

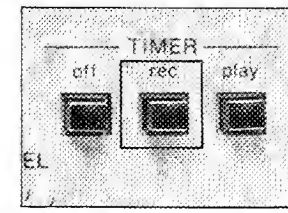
1. Be sure that erase-prevention tabs of the cassette are not broken out. If broken, cover the holes with adhesive tape.
2. Turn the LINE INPUT LEVEL controls to the 0 position and MICROPHONE INPUT LEVEL controls to the MIN position.
3. Press the BIAS selector buttons corresponding to the type of the tape.
4. Press the RECORD and PLAY buttons at the same time.

Timer Function

By using an audio timer, FM broadcasting can be automatically recorded or the tape can be automatically played back at any desired time while you are out or sleeping
Therefore, this function can be conveniently used instead of an alarm clock.

Automatic recording while you are out

1. Connect the AC cords of CD401, tuner and amplifier to the timer.
2. Turn the POWER switches of CD401, tuner and amplifier ON and then select a desired broadcasting station.
3. Make necessary adjustments in recording levels reffering to the explanation for Tape Recording. After that press the TIMER REC button.

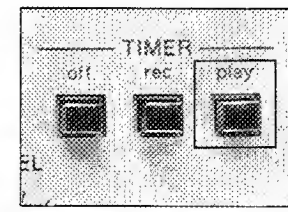


4. Preset the timer to a desired time. With this power supply is turned off except the timer.
5. At the preset time, power supply to CD401, tuner and amplifier is turned on and then tape recording starts after about 2 seconds. At the tape end, operation of CD401 stops by the Auto Stop mechanism and then power supply is cut off by the timer.

Caution: Be sure to adjust the VOLUME knob of the amplifier to the minimum setting position so that music or other item being recorded will not be reproduced by the speakers.

Automatic tape playback for morning wake up

1. Connect the AC cords of CD401, tuner and amplifier to the timer.
2. Turn the POWER switches of CD401 and amplifier ON.
3. After setting a cassette tape in the CASSETTE COMPARTMENT, press the proper EQUALIZATION selector button and adjust the OUTPUT LEVEL control.
4. Press the TIMER PLAY button. The TAPE MONITOR switch must be in the MONITOR position.
5. Preset a desired time on the timer.



Caution: For normal operation, press the TIMER OFF button without fail.

Caution

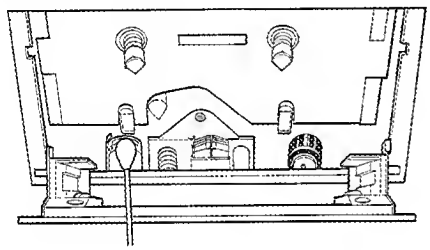
Do not tamper with the adjusting knobs marked DOLBY NR PLAYBACK CALIBRATION on the rear panel. Since they have been set to the standard Dolby level at the factory, tampering with these knobs will disable correct recording and playback through the Dolby NR systems. If playback sound through these systems is not proper, ask your retailer or send the unit back to Harman Kardon for adjustment.

Maintenance

When the unit gets dirty, wipe it with a soft dry cloth. If heavily contaminated, wipe it with a soft cloth soaked with mild soapy water and then wipe with a dry cloth. Never use alcohol, thinner, benzine or other volatile agent since the painting may be damaged.

Head Cleaning

- Drop out, degradation of frequency characteristic or wow & flutter may be caused when the recording and playback combination head, capstan and roller get dirty with magnetic material powder or dust. Clean these parts from time to time so as to enjoy perfect tape sound reproduction.
  Before cleaning, open the CASSETTE COMPARTMENT door.
  Use a cotton swab slightly wetted with diluted anhydrous alcohol and clean the recording and playback combination head, erasing head, capstan and roller which come into direct contact with the tape.
  Do not wet the cotton swab with too much alochol.
  Tape playback shall be started after thorough evaporation of alcohol.



- The recording and playback combination head, erasing head and capstan will be magnetized gradually.
  Since the magnetism causes noise generation and degradation of high-frequency range characteristic, be sure to demagnetize these parts with a head eraser.